



Review Article

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Research on the Diagnosis and Treatment of Thunderstorm Asthma in Traditional Chinese Medicine

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Abstract

Objective: To explore the new progress in the pathogenesis, diagnosis, treatment and prevention of thunderstorm asthma.

Methods: Information related to thunderstorm asthma was retrieved from 15 domestic and foreign papers through internet and CNKI search tools for analysis.

Results: Thunderstorm asthma is essentially a specific acute and severe trigger form of allergic asthma. Traditional Chinese medicine's understanding and treatment of it are based on the traditional theory of "asthma disease," which holds that thunderstorm asthma is triggered by the combined action of internal and external factors. Internal factors include latent phlegm in the lungs and the patient's constitutional predisposition; external factors encompass wind pathogens, damp pathogens, thunder-fire, and pollen. The pathogenesis involves external pathogens such as wind, dampness, and thunder-fire intertwining during thunderstorms to form "violent qi." Diagnostic and therapeutic approaches emphasize "differential diagnosis and treatment." Treatment principles involve addressing acute symptoms during attacks ("treat the symptoms in emergencies") by dispelling wind, relieving spasms, promoting lung function, resolving phlegm, and calming qi to alleviate asthma. During remission, focus shifts to tonifying the lungs, spleen, and kidneys, strengthening the body's foundation, and eliminating underlying causes. Therapeutic approaches such as oral Chinese herbal decoctions, acupuncture, acupoint application, and herbal nebulization demonstrate effective outcomes.

Conclusion: The advantages of traditional Chinese medicine lie in multi-target overall regulation, "preventing disease before it occurs" prevention and reducing dependence on hormones. At the same time, it also faces challenges such as slow onset, insufficient standardization and insufficient support from evidence-based medicine, and the need for reform of dosage forms. The combination of traditional Chinese and Western medicine is an ideal model for dealing with thunderstorm asthma, and traditional Chinese medicine has great potential in regulating constitution and long-term prevention.

Keywords: Thunderstorm asthma, traditional Chinese medicine treatment, regulating immune system, integrated traditional Chinese and western medicine

Introduction

Thunderstorm asthma is essentially a special and severe form of allergic asthma [1]. It was first reported in 1983 and the most severe incident occurred in Melbourne in 2016, causing 9 deaths within 12 hours of the thunderstorm [2]. The understanding and treatment of thunderstorm asthma in traditional Chinese medicine is based on the traditional "asthma" theory, and takes into account its suddenness, group nature, and close relationship with the external environment (wind, thunder, dampness).

Method

Literature Search Strategy

Relevant Chinese and English literature on the treatment of bronchial asthma with traditional Chinese medicine was systematically searched across databases including PubMed, Embase, Web of Science, CNKI, VIP, and Wan fang. Chinese database search terms included "pediatric asthma", "thunderstorm asthma", "traditional Chinese medicine treatment", and "preventive treatment". English search terms comprised "Thunderstorm

Asthma, “epidemics”, “spores”, and “pollen”. All searches employed a combination of subject headings and free-text terms.

Inclusion and Exclusion Criteria

- a) Inclusion Criteria: (1) Clinical studies and epidemiological research; (2) Literature in Chinese and English.
- b) Exclusion Criteria: (1) Duplicate publications or literature with unavailable full texts; (2) Studies with non-compliant diagnostic criteria; (3) Non-Chinese or non-English literature.

Literature Screening

Titles were reviewed to exclude minimally relevant studies, followed by full-text assessment to eliminate non-conforming literature.

Result

Following the above retrieval method, after reading the titles to exclude the literatures that did not meet the inclusion criteria, we further excluded the non-conforming ones by reading the full texts, and finally 15 literatures were included.

Etiology

According to traditional Chinese medicine, the occurrence of thunderstorm asthma is the result of the combination of internal and external factors [3,4].

Internal Causes: Accumulated phlegm stagnates in the lungs, and the lung, spleen, and kidney are deficient. Accumulated phlegm stagnates in the lungs: This is the “pre-existing root” for the onset of asthma. Most patients have a constitution with excessive phlegm-dampness, which is latent in the lung orifices. The formation of

phlegm is often related to spleen deficiency (malfunction in the transportation and transformation of water-dampness) and lung deficiency (malfunction in the regulation of the water pathways). Constitutional imbalance: Most patients have a special-prone constitution (allergic constitution), with weak lung defense, and are extremely sensitive to external pathogenic factors.

External Causes: Wind pathogen, dampness pathogen, thunder fire, and pollen. Wind pathogen is the root cause of all diseases [5]: Thunderstorms often accompany strong winds, and the wind pathogen has the characteristic of “good mobility and frequent changes”, which is highly consistent with the suddenness, rapid spread, and rapid symptom changes of thunderstorm asthma. Wind pathogen is the main carrier that carries pollen particles deep into the airways. Dampness pathogen is heavy and turbid: The high humidity environment before thunderstorms conform to the characteristics of “heavy and viscous” of dampness pathogen. Dampness pathogen congests the spleen, aggravating the generation of internal phlegm-dampness; at the same time, the humid environment is conducive to the growth and spread of molds and pollen. Thunder-fire (Violent Qi): In traditional Chinese medicine, thunder and lightning phenomena are regarded as a form of “fire” or “violent qi” possessing intense disruptive properties. It can disturb latent phlegm, disrupt the body’s inherent equilibrium, activate accumulated phlegm, combine with wind pathogens, and abruptly invade the lungs. This leads to obstruction of lung qi, impaired dispersion and descent functions, thereby triggering sudden asthma attacks. Pollen (Turbid Qi, Violent Qi): High concentrations of pollen are regarded as an “external turbid or violent qi,” serving as the fundamental substance directly triggering allergic reactions [6].

Summary of Pathogenesis

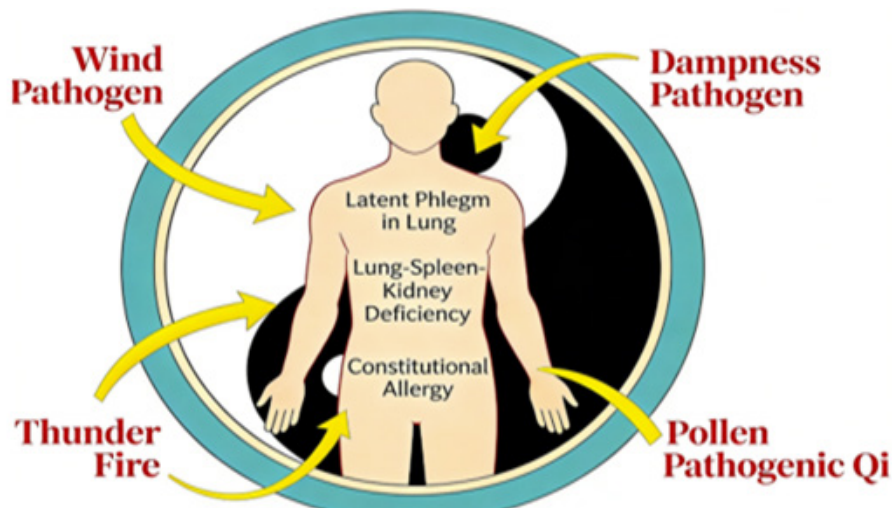


Figure 1: The occurrence of thunderstorm asthma.

Under this special meteorological condition of thunderstorms, external pathogens such as wind, dampness, thunder-fire, etc. interweave and form a powerful "Violent Qi", taking advantage of the weakness of the lung defense to trigger the accumulated phlegm in the body. Phlegm and qi congeal, blocking the airways, leading to the failure of lung qi to ascend and descend normally, causing sudden severe wheezing, coughing, and chest tightness symptoms [7]. Its nature is mostly deficiency of the root and excess of the manifestation, with wind pathogen, phlegm turbidity, qi-congestion, etc. as the main manifestations during the attack period (Figure 1).

Diagnosis and Treatment Strategy

In the diagnostic and treatment system of Traditional Chinese Medicine (TCM), "treatment based on syndrome differentiation" is the core approach. "Syndrome differentiation" refers to collecting patient information through the four diagnostic methods of observation, auscultation and olfaction, inquiry, and palpation, and integrating factors such as constitution, environment, and emotion to summarize the syndrome type of the disease. "Treatment based on differentiation" means selecting therapeutic methods (e.g., clearing heat, resolving dampness, tonifying qi) and medicinal prescriptions (e.g., decoctions, acupuncture, tuina massage) according to the syndrome type, emphasizing the delivery of precise treatment.

For acute exacerbations of thunderstorm asthma, the common syndrome types identified in TCM differentiation are as follows [8]:

- a) Syndrome of Wind Pathogen Invading the Lung:** The main syndrome type, characterized by sudden itchy and sore throat accompanied by paroxysmal cough and asthma with rapidly changing symptoms. On physical examination, the tongue coating is thin and white.
- b) Syndrome of Phlegm-Turbidity Obstructing the Lung:** Manifested as shortness of breath, wheezing with phlegm rales in the throat, chest tightness as if blocked, and expectoration of sticky phlegm. On physical examination, the tongue coating is thick and greasy.
- c) Syndrome of Cold Asthma:** Presenting with clear, frothy phlegm, absence of thirst, and intolerance to cold. On physical examination, the tongue is pale with a white and slippery coating.
- d) Syndrome of Heat Asthma:** Characterized by rapid and forceful breathing, paroxysmal cough, yellow sticky phlegm, bitter taste in the mouth and thirst. On physical examination, the tongue is red with a yellow and greasy coating.

It should be noted that due to the fire nature of thunderstorms, heat asthma or mixed cold-heat syndrome are also relatively common in thunderstorm asthma cases. TCM treatment for thunderstorm asthma is divided into two major parts. During the acute exacerbation phase, TCM adheres to the principle of treating the acute symptoms first, aiming to quickly relieve tracheal spasm, improve ventilation, and prioritize dispelling wind to relieve spasm, diffusing lung qi to resolve phlegm, and descending

adverse qi to relieve asthma. Medications are administered based on syndrome differentiation, with commonly used prescriptions including: Shegan Mahuang Decoction (from Synopsis of Golden Chamber): It warms the lung to resolve fluid retention and relieves cough and asthma, suitable for cold asthma syndrome. Maxing Shigan Decoction (from Treatise on Febrile Diseases): It induces diaphoresis with pungent-cool herbs and clears lung heat to relieve asthma, suitable for heat asthma syndrome. Dingchuan Decoction (from Effective Prescriptions for Health Preservation): It diffuses lung qi to descend adverse qi and clears heat to resolve phlegm, suitable for syndrome of phlegm-heat stagnating in the lung. Xiaoqinglong Decoction (from Treatise on Febrile Diseases): It relieves exterior syndrome and dispels cold, and warms the lung to resolve fluid retention, suitable for syndrome of exterior cold with interior fluid retention. In modern times, with the development of TCM, many contemporary practitioners add wind-dispelling and spasm-relieving herbs to these classic prescriptions, such as: Earthworm: It unblocks collaterals and relieves spasm. Cicada Slough and Stiff Silkworm: They dispel wind to relieve spasm. Arnebia Root: It cools blood, promotes blood circulation, and has anti-allergic effects. These herbs help the body quickly alleviate airway spasm [9]. Meanwhile, during the acute phase, acupuncture therapy can achieve rapid anti-asthmatic effects by needling acupoints such as Dingchuan (EX-B1), Feishu (BL13), Tanzhong (CV17), Lieque (LU7), and Chize (LU5). TCM atomization inhalation is another treatment method for acute asthma exacerbations, which involves nebulizing TCM injections or decoctions with anti-asthmatic and phlegm-resolving effects (e.g., Chuankezhi Injection). This allows the medicine to act directly on the airways for rapid onset of action.

In the remission stage of thunderstorm asthma, TCM follows the therapeutic principle of treating the root cause for chronic conditions, focusing on tonifying the lung, spleen and kidney, strengthening healthy qi to consolidate the body resistance, and eliminating the "congenital root cause" (latent phlegm). This approach regulates immunity, improves allergic constitution, and thereby prevents recurrent asthma attacks. Commonly used prescriptions include: Yupingfeng Powder (from Classified Collection of Medical Prescriptions): It tonifies qi, consolidates the exterior and arrests sweating, and is indicated for those with lung qi deficiency, unconsolidated defensive exterior and susceptibility to wind pathogens. Liujunzi Decoction (from Orthodox Essentials of Medicine): It tonifies qi, invigorates the spleen, dries dampness and resolves phlegm, and is suitable for patients with phlegm generated due to spleen deficiency. Jinkui Shenqi Pill / Qiwei Duqi Pill: These prescriptions tonify the kidney and assist qi absorption, and are applicable to cases where prolonged illness affects the kidney leading to failure of qi absorption by the kidney. During the remission stage, moxibustion therapy can also be adopted for asthma treatment. It is recommended to perform moxibustion on acupoints such as Dazhui (GV14), Feishu (BL13), Pishu (BL20), Shenshu (BL23) and Zusanli (ST36) to warm yang, tonify qi, strengthen healthy qi and consolidate the body resistance. Another applicable therapy in the remission stage is acupoint application, such as Sanfu Plaster or Sanjiu Plaster. This therapy involves

applying pungent-warm and penetrating medicinal pastes to acupoints on the back during specific solar terms. It stimulates meridians, warms yang qi, and dispels latent internal cold-phlegm,

serving as a classic example of TCM's preventive treatment of disease to ward off asthma attacks (Table 1).

Table 1

English Name of Acupoint (International Code)	Location Description
Dingchuan (EX-B1)	Located on the back, 0.5 cun lateral to the lower border of the spinous process of the 7th cervical vertebra
Feishu (BL13)	Located in the spinal region, 1.5 cun lateral to the posterior midline, below the spinous process of the 3rd thoracic vertebra
Tanzhong (CV17)	Located on the chest, on the anterior midline, level with the 4th intercostal space, namely at the mid-point of the line connecting the two nipples
Lieque (LU7)	Located on the radial border of the forearm, above the radial styloid process, 1.5 cun proximal to the transverse crease of the wrist, between the brachioradialis and abductor pollicis longus tendons
Chize (LU5)	Located in the cubital region, on the cubital transverse crease, in the depression on the radial side of the biceps brachii tendon
Dazhui (GV14)	Located in the spinal region, in the depression below the spinous process of the 7th cervical vertebra
Pishu (BL20)	Located in the spinal region, 1.5 cun lateral to the posterior midline, below the spinous process of the 11th thoracic vertebra
Shenshu (BL23)	Located in the spinal region, 1.5 cun lateral to the posterior midline, below the spinous process of the 2nd lumbar vertebra
Zusanli (ST36)	Located on the lateral side of the lower leg, 3 cun inferior to Dubi (ST35), on the line connecting Dubi (ST35) and Jiexi (ST41)

Conclusion

At present, there are relatively few high-quality clinical studies on traditional Chinese medicine specifically targeting “thunderstorm asthma”, but there are abundant studies on allergic asthma, and their principles are similar [10]. Modern pharmacological research has confirmed that many anti-inflammatory traditional Chinese medicines (such as *Ephedra*, apricot kernel, earthworm, *scutellaria baicalensis*, etc.) have anti-inflammatory, anti-allergic, and bronchial smooth muscle relaxation effects. Tonic and strengthening traditional Chinese medicines (such as *astragalus*, *atractylodes*, *saposhnikovia*) can regulate immune function (such as regulating the Th1/Th2 balance and reducing IgE levels), and improve allergic constitution.

The advantage of traditional Chinese medicine lies in multi-targeted and holistic regulation: not only targeting symptoms, but also focusing on regulating the overall functions and constitution of the body [11]; preventive advantage: the concept of “preventing disease before it occurs” is prominent [12], through the regulation during the remission period, it can significantly reduce the frequency and severity of attacks; reducing hormone dependence: for patients who need to use hormones for a long time. However, the long-term use of hormones has side effects, such as metabolic disorders, immune suppression, osteoporosis, thinning of the skin, and damage to the digestive system. In the clinical management of asthma, a chronic inflammatory respiratory disorder affecting millions worldwide, Western medicine frequently relies on hormonal medications—such as Inhaled Corticosteroids (ICS) or oral glucocorticoids—for long-term control. This approach is rooted in hormones' potent anti-inflammatory properties, which help suppress airway hyperresponsiveness and reduce the

frequency of acute asthma exacerbations, a critical goal for patients with moderate to severe disease. However, the prolonged use of these hormonal agents carries a spectrum of well-documented side effects that can significantly impact patients' quality of life and long-term health. Metabolic disorders, for instance, may manifest as weight gain, hyperglycemia, or dyslipidemia, disrupting the body's normal energy balance; immune suppression weakens the body's defense against infections, making patients more susceptible to respiratory tract infections or even systemic illnesses. Osteoporosis, another major concern, arises as hormones interfere with bone metabolism—reducing bone formation and accelerating bone resorption—elevating the risk of fractures, especially in elderly patients or those with preexisting bone density issues. Additionally, long-term hormone use can lead to skin thinning, causing increased fragility, easy bruising, or even delayed wound healing, while also exerting harmful effects on the digestive system, such as inducing gastritis, gastric ulcers, or exacerbating gastroesophageal reflux disease. In contrast, the integration of Traditional Chinese Medicine (TCM) into asthma treatment offers a valuable complementary approach, particularly in mitigating reliance on hormonal medications. TCM's therapeutic philosophy focuses on addressing the “root cause” of diseases rather than merely alleviating symptoms; for asthma, this often involves regulating the body's internal balance (such as harmonizing the lung, spleen, and kidney systems, which TCM believes are closely associated with respiratory health) and resolving underlying stagnation or deficiency. Through the use of personalized herbal formulations, acupuncture, or tuina massage, TCM can help modulate the body's inflammatory response, enhance lung function, and strengthen overall immunity. Notably, for patients requiring long-term hormone therapy, TCM intervention has been shown to

play a pivotal role in reducing hormonal dosage while alleviating associated side effects. For example, specific herbal combinations may help counteract hormone-induced metabolic imbalances by regulating lipid and glucose metabolism, or protect bone density by promoting osteoblast activity and inhibiting osteoclast function. By enhancing the body's self-regulatory capacity, TCM not only reduces the need for high-dose hormones but also minimizes the risk of adverse effects, ultimately improving treatment tolerance and long-term prognosis for asthma patients [13]. The challenge is that the onset speed is relatively slow. In acute and severe attacks, bronchodilators and hormones from Western medicine are still the first choice for saving lives. Traditional Chinese medicine can be used as a complementary treatment or used alone in mild to moderate patients; standardization and evidence-based medicine support is insufficient, and more well-designed large-sample Randomized Controlled Trials (RCTs) are needed to provide high-level evidence; formulation reform is also one aspect, and it is necessary to develop faster and more convenient emergency traditional Chinese medicine formulations.

Traditional Chinese Medicine has a unique theoretical framework and rich practical experience in treating asthma caused by thunderstorms. Its strategy of "dispelling wind and relieving spasms, expelling phlegm and promoting lung function to treat the symptoms, and nourishing the lung, spleen and kidney to treat the root cause" is in line with the modern medical concept of "anti-inflammatory and relieving spasms, immune regulation". Advice for the public and patients: During acute attacks: Immediately use Western medicine emergency drugs [14] (such as salbutamol inhaler) and seek medical attention as soon as possible. Traditional Chinese Medicine can be used as an auxiliary treatment at this time to help quickly control symptoms. During remission and prevention: This is the key stage for traditional Chinese Medicine to exert its advantages. For patients with a history of allergies and asthma, before the thunderstorm season arrives [15] (especially in the summer and autumn), actively pay attention to the pollen concentration monitoring reports, seek help from professional traditional Chinese medicine practitioners, and undergo physical conditioning (such as taking Yupingfeng Powder, which nourishes qi and consolidates the exterior), or receive preventive treatments such as triple-heat-adding moxibustion to enhance one's disease resistance and prevent the onset of the disease before it occurs.

In conclusion, the integration of traditional Chinese and Western medicine is an ideal approach to addressing the complex public health issue of thunderstorm asthma. Traditional Chinese medicine plays an indispensable role in this process, especially in terms of physical constitution regulation and long-term prevention, where it has great potential.

Conflict of Interest

This article declares that there is no conflict of interest.

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